A COMPACT METEOROLOGICAL WATER-FOLLOWING (MET) DRIFTER FOR AIRCRAFT DEPLOYMENT

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LONG-TERM GOALS

The goals of this research are to construct an air-deployable drifter that has the capability to measure a suite of oceanographic and meteorological parameters and to report its position and the data in real time through satellites or other remote links.

OBJECTIVES

Tactical operational requirements have been recently expanded by the NAVY for a suite of oceanographic / meteorological/ acoustic air-deployable mini-drifting buoys. The scientific objective is to build an air-deployable drifter which has the capability to accurately follow water motions and measure wind speed and wind direction and wave heights to NAVY specified requirements for a period in excess of three months. This drifter will be used in a number of scientific studies (e.g. NSCAT Verification Experiment and the Japan/East Sea DRI in 1998, 1999 and 2,000).

APPROACH

The MOD-1 MINIMET consists of a collapsible holey-sock, of drag area ratio 40:1, attached by a thin conducting cable to a spherical surface float. The float houses the ARGOS transmitter, data processor, SST sensor and batteries. Wind speed is measured with a WOTAN at the top of the drogue. Wind direction is measured by a vane on the mast attached to the float. Wave data will be measured by a strain gauge at the base of the tether attachment, which also serves as a drogue-on indicator. In MOD-II, a data chain is attached to the surface float instead of a drogue.

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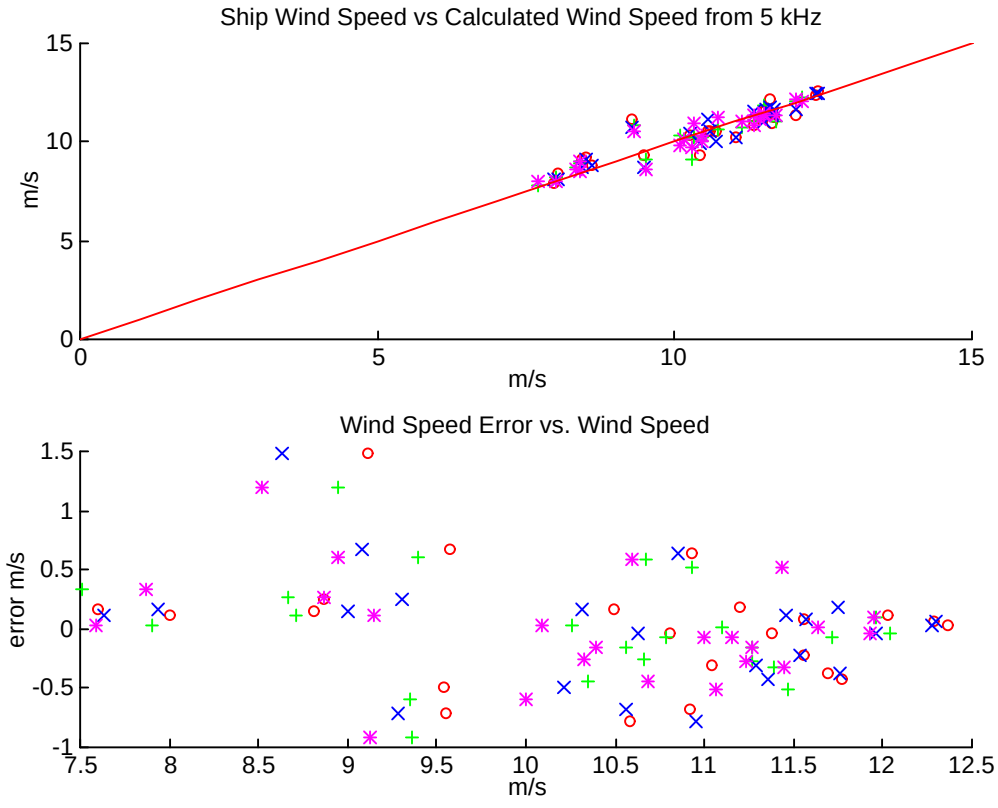
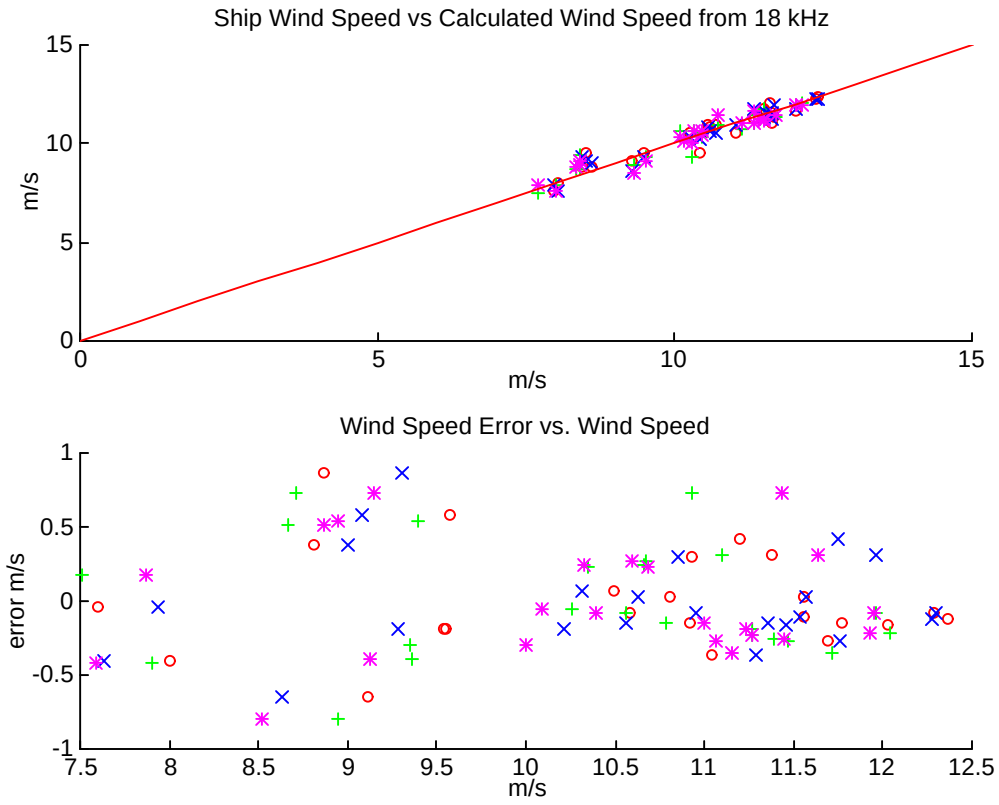
WORK COMPLETED

Twenty-four MINIMET-1's were deployed in the Labrador Sea between December, 1996 - February, 1997. The sensor data was sent via ARGOS. The data for 12 units has been processed. Recently three MINIMET-II's have been deployed in the Mediterranean Sea.

RESULTS

The comparison of MINIMET data with NSCAT and ECMWF over the Labrador Sea shows that the direction algorithm works well. The wind algorithm were done off Southern California in September, 1997. These latter show wind reponses of the ambient noise spectrum as expected and sensitivity of 0.5 m/sec. See calibrations-curves @ 5 and 18 kmz below.





IMPACT/APPLICATIONS

The potential for use of MINIMETs in scientific exploration of ocean circulation is excellent, provided that the development program continues to provide more data on the calibration and the accuracy of the devices. Strong interest has been expressed by NAVOCEANO in using the MINIMET drifter.

TRANSITIONS

The National Weather Service is using MINIMETs for operational deployments and five MINIMETS have thus far been built for NWS.

RELATED PROJECTS

Several programs use Drifting Buoys similar to the MINIMET:

1. NOAA programs: Drifter Measurements of Velocity, SST and PA; Autonomous Observations in the Southern Ocean with Drifter and the National Weather Service already mentioned, West Coast Drifter Program.

2. NSF programs also rely on data from drifters similar to the MINIMET: Analysis of Pacific WOCE drifter data; Analysis of the Upper Ocean Budgets of heat, Salt and Momentum.

3. NASA programs utilizing a similar drifter: "Biogeochemical Response to Mesoscale Physical Forcing in Calif. Current System" and "A Quantitative Study of the Pt. Conception Upwelling System.

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